Quality Assurance Scan Surveys Following
ORISE IV of Building 707

Executive Summary

Pursuant to discussions with DOE/RFPO, CDPHE, ORISE, and K-H representatives on November 29 and December 1, 2004, additional quality assurance (QA) surveys were conducted in Building 707. A written survey protocol was developed and approved by DOE/RFPO, ORISE, and CDPHE representatives. Based upon this protocol, five 707 survey units were selected for these additional QA surveys. Three Class 1 survey units were selected which ORISE did not survey as part of their validation studies. Two Class 2 survey units were selected in which ORISE performed validation surveys. Results of these additional surveys indicate that all five survey units meet the agreed upon survey criteria. All elevated areas were verified to be less than 100 dpm/100 cm^2 over the affected one square meter area in accordance with DOE Order 5400.5.

Initially, two of the chosen survey units did not meet the first 10 percent scan criteria. However, both of these units (707065B and 707096B) did meet the second 10 percent scan criteria. Two identified areas (one in each survey unit) have been remediated to <300 dpm/100 cm^2. The pre-remediated levels were 520 dpm/100 cm^2 and 535 dpm/100 cm^2.

Introduction/Scope

Additional quality assurance scan surveys have been performed in Building 707 based upon agreements among DOE/RFPO, CDPHE, ORISE, and K-H. These surveys were performed with oversight by K-H supervision, DOE/RFPO, and on-site MARSSIM experienced personnel. A total of five survey units were selected: Three Class 1 survey units which were not surveyed by ORISE; and two Class 2 survey units which were surveyed by ORISE. These units were selected based upon a bias toward higher potential for contamination due to historical activities in Building 707. This historical criteria resulted in survey units being selected in Modules A, B, E, and J, as shown in the following table.

Module	Survey Unit	Area Classification	Area Description
A	707021	2	walls, ceilings, columns
B	707030	2	walls, ceilings, columns
B	707031	1	floors
E	707065	1	floors
J	707096	1	floors

Letter designations were used behind the survey unit number in the survey data packages to indicate the number of 10 percent scans required for each unit. For example, both survey units 707065 and 707096 required a second 10 percent scan, therefore, two data packages exist for each of these two packages, i.e. 707065A and 707065B and likewise

for 707096A and 707096B. Blue grids on the survey maps identify the first 10 percent scan grids for the "A" packages. Green grids on the survey maps identify the second 10 percent scan grids for the "B" packages. Scan grid maps were generated through a random grid process.

The following agreed upon protocol was utilized to perform the quality assurance surveys:

- Grid 10% of selected survey units
- Perform and document scans of areas
- Remediate all areas $\geq$ 300 dpm/100 cm^2
- If remediation is required, select and scan an additional 10% within same area
- Repeat until scan results indicate <300 dpm/100 cm^2
- Complete all selected survey units
- Report all results to DOE/RFPO for transmittal to ORISE for review/comment

All survey measurements were performed using NE Electra instrumentation with DP-6 probes, which have a calculated minimum detectable activity of approximately 75 dpm/100 cm^2.

Radiological Survey Results

Survey Unit 707021A
This survey unit is comprised of the walls, columns, and ceiling in the "A" module area, on the first floor of Building 707. The walls and ceiling were part of the corridor, separated by drywall walls and a false ceiling, and not a part of "A" module. Therefore, it is classified as a Class 2 survey unit. The classification was based on the minimal potential for contamination due to process history. No contamination in excess of the unrestricted release limits was anticipated. 707021 was surveyed by ORISE during its independent verification surveys of Building 707.

Survey unit 707021A met the 10 percent scan criteria with the highest detected contamination level of 265 dpm/100 cm^2. No further action is necessary. Refer to attached data package for 707021A for radiological survey data, investigation documentation, survey map locations, data sheets, and instrument information.

Survey Unit 707030A
This survey unit is comprised of the walls, columns, and ceiling in the "B" module area, on the first floor of Building 707. The walls and ceiling were part of the corridor, separated by drywall walls and a false ceiling, and not a part of "B" module. Therefore, it is classified as a Class 2 survey unit. The classification was based on the minimal potential for contamination due to process history. 707030 was surveyed by ORISE during its independent verification surveys of Building 707.

Survey unit 707030A met the 10 percent scan criteria with the highest detected contamination level of 280 dpm/100 cm^2. No further action is necessary. Refer to

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attached data package for 707030A for radiological survey data, investigation documentation, survey map locations, data sheets, and instrument information.

Survey Unit 707031A

This survey unit is comprised of the floor surfaces between column lines C-D and 3-5 in the "B" module area, on the first floor of Building 707. It is classified as a Class 1 survey unit. The classification is based upon the higher potential for contamination due to process history. 707031 was not surveyed by ORISE during its independent verification surveys of Building 707.

Survey unit 707031A met the 10 percent scan criteria with the highest detected contamination level of 95 dpm/100 cm^2. No further action is necessary. Refer to attached data package for 707031A for radiological survey data, investigation documentation, survey map locations, data sheets, and instrument information.

Survey Unit 707065A

This survey unit is comprised of the floor surfaces between column lines K-L and 9-11 in the "E" module area on the first floor of Building 707. It is classified as a Class 1 survey unit. The classification is based upon the higher potential for contamination due to process history. 707065 was not surveyed by ORISE during its independent verification surveys of Building 707.

Survey Unit 707065A did not meet the first 10 percent scan criteria. Survey grid #2 indicated one 100 cm^2 area of 520 dpm. Therefore, an additional 10 percent scan area was randomly generated, gridded, and surveyed. This new area was identified as Survey Unit 707065B and survey results indicate that this unit met the second 10 percent scan criteria. The highest contamination level detected in 707065B was 165 dpm/100 cm^2.

The area within survey unit 707065A of 520 dpm/100 cm^2 has been remediated to <300 dpm/100 cm^2.

Grid #4 in 707065A initially indicated several 100 cm^2 areas that would have averaged greater than 100 dpm/100 cm^2, without any one area greater than 300 dpm/100 cm^2. A resurvey confirmed all levels to be less than the 100 dpm/100 cm^2. Therefore, the initial elevated results were attributed to short-lived radon progeny. Refer to the Radon Investigation Information section of this report for general details.

Survey Unit 707096A

This survey unit is comprised of the floor surfaces between columns O-Q and 1-3 in the "J" module area on the first floor annex of Building 707. It is classified as a Class 1 survey unit. The classification was based on the higher potential for contamination due to process history. 707096 was not surveyed by ORISE during its independent verification surveys of Building 707.

Survey Unit 707096A did not meet the first 10 percent scan criteria. Survey grid #23 indicated one 100 cm^2 area of 535 dpm. Therefore, an additional 10 percent scan area

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was randomly generated, gridded, and surveyed. This new area was identified as Survey Unit 707096B and survey results indicate that this unit met the second 10 percent scan criteria. The highest contamination level detected in 707096B was 275 dpm/100 cm^2.

The area within survey unit 707096A of 535 dpm/100 cm^2 has been remediated to <300 dpm/100 cm^2.

Radon Investigation Information

During these quality assurance surveys, radon interference was observed. A few survey grids initially indicated elevated levels ranging from approximately 500 to 700 dpm/100 cm^2. Follow-up surveys along with tape presses on the specific areas proved the radon interference. All final grid survey results documented on the data sheets are actual results without radon interference.

Disposition of ORISE Suspected Elevated Areas

Confusion may have occurred during the October 11- 15, 2004 ORISE site verification activities regarding specific areas within Building 707 not meeting the free release criteria. For these areas, K-H planned to plate or otherwise control the building material as contaminated waste during building demolition. This became evident upon review of the ORISE survey data and the ORISE Interim Report Letter, dated November 24, 2004, to Mr. Gary Shuetz, (DOE/RFPO) from Phyllis Weaver (ORISE/ESSAP).

Even though several of the suspected elevated areas were identified by ORISE in their survey data reports with footnotes stating "location to be covered with steel plate and removed after building demolition," ORISE utilized these elevated survey results to indicate potential concerns with the K-H release survey protocol.

Please note, all of the areas in question were identified by K-H prior to the ORISE verification surveys to be plated, controlled and handled as contaminated waste during or after demolition. Two of the areas in question are large area depressions in the first floor of Building 707 and were filled with flow fill concrete as a special control measure which will be removed as part of the contaminated slab removal after demolition.

Miscommunication on the part of KH with the onsite ORISE survey personnel resulted in areas being misidentified as areas for free release instead of areas requiring appropriate controls for handling as contaminated waste during demolition.

An additional factor which resulted in confusion was that active remediation was being performed in some areas of Building 707 while ORISE was conducting independent verification surveys. This resulted in ORISE personnel surveying an area in which final remediation and/or K-H release surveys had not been completed. Most of these identified areas were remediated and validated by ORISE as meeting free release criteria prior to ORISE personnel leaving the site. DOE/RFPO and K-H personnel performed final

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verification for appropriate disposition of these areas through a visual inspection and walk-down on December 2, 2004.

The following table provides disposition of the ORISE reported suspected elevated area surveys. This table utilizes the initial ORISE measurements in dpm/100cm^2. However, through discussions between DOE/RFPO and ORISE management, it is expected that ORISE will resolve the instrument calibration differences between the K-H and ORISE protocol (2π versus 4π calibration). This will result in ORISE measurement values reflecting the approved site pre-demolition survey plan protocol.

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Suspected Elevated Area Disposition

Module	Survey Unit	ORISE Measurement Location	ORISE Measurement [1] (dpm/100cm^2)	Disposition Comments
J	707095	40D	1,400	Note 2 below
J	707095	41D	31,000	Note 2 below
K	707093	29E	1,000	Note 3 below
K	707093	30E	3,900	Note 3 below
K	707093	31E	1,700	Note 3 below
K	707093	32E	1,100	Note 3 below
F	707070	66	4,700	ORISE Validated KH remediation to 43 dpm/100cm^2
F	707070	68	4,700	ORISE Validated KH remediation to 43 dpm/100cm^2
A	707022	96C	1,900	ORISE Validated KH remediation to 94 dpm/100cm^2
A	707022	97C	1,800	ORISE Validated KH remediation to 110 dpm/100cm^2
A	707024	57C	1,100	ORISE Validated KH remediation to 220 dpm/100cm^2
A	707024	58C	4,600	ORISE Validated KH remediation to 120 dpm/100cm^2
A	707024	64C	2,600	ORISE Validated KH remediation to 120 dpm/100cm^2
A	707027	68C	2,300	ORISE Validated KH remediation to 72 dpm/100cm^2
A	707027	70C	12,000	Note 2 below
B	707030	83B	2,500	Note 2 below
B	707035	39C	9,500	Note 2 below
B	707035	40C	3,000	Note 2 below
B	707035	41C	1,400	ORISE Validated KH remediation to 79 dpm/100cm^2
B	707036	47C	2,700	ORISE Validated KH remediation to 120 dpm/100cm^2
D	707048	19A	1,500	ORISE Validated KH remediation to 72 dpm/100cm^2
E	707062	36A	1,600	ORISE Validated KH remediation to 110 dpm/100cm^2
E	707057	92B	3,800	Note 4 below
K	707098	44D	530	KH remediated to less than 94 dpm/100cm^2
K	707098	45D	800	KH remediated to less than 94 dpm/100cm^2
K	707098	46D	690	KH remediated to less than 94 dpm/100cm^2
J	707118	14E	1,100	ORISE Validated KH remediation to 120 dpm/100cm^2
J	707118	17E	1,200	ORISE Validated KH remediation to 58 dpm/100cm^2
J	707118	18E	2,300	ORISE Validated KH remediation to 100 dpm/100cm^2

Notes:

1. ORISE expected to revise initially reported measurement values
2. Area plated to be removed after building demolition as LLW
3. Area remediated to <300dpm/100cm^2
4. Area identified for removal during demolition (structural steel)

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